2006. The Examiner is requested to enter and consider the following amendments and remarks.

<u>In the Claims:</u>

Please amend the Claims as follows:

1. (Currently Amended) A method for brightness and contrast normalization in appearance-based object detection, the method comprising:

extracting a plurality of training images;

finding eigenimages corresponding to the training images;

receiving an input image;

forming a projection equation responsive to the eigenimages by adding a scaling and a shift to image intensity; and simultaneously solving for intensity normalization parameters;

computing projected and normalized images;

computing an error-of-fit of the projected and normalized images;

thresholding the error-of-fit; and

determining object positions in accordance with the thresholded error-of-fit.

2. (Original) A method as defined in Claim 1 wherein finding eigenimages comprises:

sub-sampling the training images;

forming training images of coarse resolution in accordance with the sub-sampled images;

computing eigenimages corresponding to the training images of coarse resolution;

interpolating the eigenimages for coarse resolution;

performing orthonormalization on the interpolated images by singular value decomposition; and

providing pseudo-eigenimages corresponding to the orthonormalized images for a finer resolution.

3. (Original) A method as defined in Claim 1 wherein at least one of said plurality of training images and said input image comprises a single-photon emission computed tomography image.

4. (Original) A method as defined in Claim 1 wherein the computed error-of-fit is represented by a score image.

5. (Currently Amended) A method as defined in Claim 1, further comprising of forming eigenimages for multiresolution, the method comprising including:

sub-sampling a plurality of training images;

forming training images of coarse resolution in accordance with the sub-sampled images;

computing coarse eigenimages corresponding to the training images of coarse resolution;

interpolating the coarse eigenimages for a finer resolution;

orthonormalizing the interpolated images; and

providing pseudo-eigenimages corresponding to the orthonormalized images for a finer resolution,

wherein the pseudo-eigenimages are formed with a projection equation responsive to the coarse eigenimages by adding a scaling and a shift to image intensity.

6. (Original) A method as defined in Claim 5 wherein orthonormalizing the interpolated images comprises performing a singular value decomposition.

7. (Currently Amended) A system for appearance-based object detection, the system comprising:

a training unit for training images comprising at least one of eigenimages and pseudo-eigenimages; and

a detection unit responsive to an input image, which input image has a different brightness and contrast than the trained images, for simultaneously solving for intensity normalization and detecting objects corresponding to the

trained images by adding a scaling and a shift to image intensity with a projection equation.

8. (Original) A system as defined in Claim 7 wherein the input image comprises a single-photon emission computed tomography image.

9. (Original) A system as defined in Claim 7, further comprising:

a CPU in signal communication with said detection unit for processing the input image.

10. (Original) A system as defined in Claim 9, further comprising:

a display adapter in signal communication with the CPU for displaying the input image; and

an I/O adapter in signal communication with the CPU for recalling the locations of the objects detected in the input image to provide an indication of the location of the detected object within the input image.

11. (Original) A system as defined in Claim 9, further comprising:

a user interface adapter in signal communication with the CPU for at least receiving a selection decision for at least one image from a user.

12. (Currently Amended) A system for brightness and contrast

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normalization in appearance-based object detection, the system comprising:

extraction means for extracting a plurality of training images;

finding means for finding eigenimages corresponding to the training

images;

receiving means for receiving an input image;

forming/solving means for forming a projection equation responsive to the

eigenimages by adding a scaling and a shift to image intensity; and

simultaneously solving means for solving for intensity normalization parameters;

computing means for computing projected and normalized images;

fitting means for computing an error-of-fit of the projected and normalized

images;

thresholding means for thresholding the error-of-fit; and

determining means for determining object positions in accordance with the

thresholded error-of-fit.

13. (Original) A system as defined in Claim 12 wherein said finding means

comprises:

sub-sampling means for sub-sampling the training images;

training means for forming training images of coarse resolution in

accordance with the sub-sampled images;

eigenimaging means for computing eigenimages corresponding to the

training images of coarse resolution;

interpolating means for interpolating the eigenimages for coarse resolution;

orthonormalization means for performing orthonormalization on the interpolated images by singular value decomposition; and

pseudo-eigenimaging means for providing pseudo-eigenimages corresponding to the orthonormalized images for a finer resolution.

14. (Original) A system as defined in Claim 12 wherein at least one of said plurality of training images and said input image comprises a single-photon emission computed tomography image.

15. (Original) A system as defined in Claim 12 wherein the computed error-of-fit is represented by a score image.

16. (Currently Amended) A system as defined in Claim 12, further comprising means for forming eigenimages for multiresolution, the system comprising including:

sub-sampling means for sub-sampling a plurality of training images;

training means for forming training images of coarse resolution in accordance with the sub-sampled images;

eigenimaging means for computing coarse eigenimages corresponding to the training images of coarse resolution;

interpolating means for interpolating the coarse eigenimages for a finer

resolution;

orthonormalizing means for orthonormalizing the interpolated images; and

pseudo-eigenimaging means for providing pseudo-eigenimages

corresponding to the orthonormalized images for a finer resolution,

wherein the pseudo-eigenimages are formed with a projection equation

responsive to the coarse eigenimages by adding a scaling and a shift to image

intensity.

17. (Original) A system as defined in Claim 16 wherein said

orthonormalizing means comprises decomposition means for performing a

singular value decomposition.

18. (Currently Amended) A program storage device readable by machine,

tangibly embodying a program of instructions executable by the machine to

perform method steps for brightness and contrast normalization in appearance-

based object detection, the method steps comprising:

extracting a plurality of training images;

finding eigenimages corresponding to the training images;

receiving an input image;

forming a projection equation responsive to the eigenimages by adding a

scaling and a shift to image intensity; and simultaneously solving for intensity

normalization parameters;

computing projected and normalized images;

computing an error-of-fit of the projected and normalized images;

thresholding the error-of-fit; and

determining object positions in accordance with the thresholded error-of-fit.

19. (Original) A program storage device as defined in Claim 18 wherein the program step of finding eigenimages comprises:

sub-sampling the training images;

forming training images of coarse resolution in accordance with the sub-sampled images;

computing eigenimages corresponding to the training images of coarse resolution;

interpolating the eigenimages for coarse resolution;

performing orthonormalization on the interpolated images by singular value decomposition; and

providing pseudo-eigenimages corresponding to the orthonormalized images for a finer resolution.

20. (Original) A program storage device as defined in Claim 18 wherein at least one of said plurality of training images and said input image comprises a

single-photon emission computed tomography image.

21. (Original) A program storage device as defined in Claim 18 wherein the computed error-of-fit is represented by a score image.

22. (Currently Amended) A program storage device <u>as defined in Claim 18, further comprising</u> ~~readable by machine, tangibly embodying a program of~~ ~~instructions executable by the machine to perform~~ method steps for forming eigenimages for multiresolution, ~~the method steps comprising~~ <u>including</u>:

sub-sampling a plurality of training images;

forming training images of coarse resolution in accordance with the sub-sampled images;

computing coarse eigenimages corresponding to the training images of coarse resolution;

interpolating the coarse eigenimages for a finer resolution;

orthonormalizing the interpolated images; and

providing pseudo-eigenimages corresponding to the orthonormalized images for a finer resolution,

wherein the pseudo-eigenimages are formed with a projection equation responsive to the coarse eigenimages by adding a scaling and a shift to image intensity.

23. (Original) A program storage device as defined in Claim 22 wherein the program step of orthonormalizing the interpolated images comprises performing a singular value decomposition.